

### REMARKS

In response to the office action mailed November 23, 2007, Applicants submit the following remarks. Claims 4, 13, 16, 28, 31, 33-63 and 71 were previously cancelled. Claims 1-3, 5-12, 14, 15, 17-27, 29, 30, 32, 64-70, and 72-78 are presented for examination.

Claims 1-3, 6, 7, 9-11, 17, 19-22, 25, 26, 32, 64-66, 68, 69, 72, 73, and 76-78 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pub. 2001/0047166 ("Wuchinich") in view of U.S. Pub. 2003/0045887 ("Sakurai") in view of U.S. Patent No. 5,269,297 ("Weng") and in further view of U.S. Patent No. 3,565,062 ("Kuris").<sup>1</sup> But Wuchinich, Sakurai, Weng, and Kuris, taken alone and in combination, fail to disclose or suggest a probe that is configured such that cavitation is produced, in a medium surrounding the probe, along a portion of the probe having a radially asymmetric cross section when the portion of the probe having the radially asymmetric cross section torsionally vibrates during use, as required by Applicants' claims 1-3, 6, 7, 9-11, 17, 19-22, 25, 26, 32, 72, 73, 76, and 77, or a probe configured to produce cavitation, in a medium surrounding the probe, along a portion of the probe having a radially asymmetric cross section when the portion of the probe having the radially asymmetric cross section torsionally vibrates during use, as required by Applicants' claims 64-66, 68, 69, and 78.

The Examiner noted that Wuchinich fails to disclose "operating at the resonant frequency of the transducer," but contended that it would have been obvious to a person of ordinary skill in the art, in view of Sakurai, to modify Wuchinich's device to include this feature, which, according to the Examiner, is disclosed by Sakurai. Office action mailed March 23, 2007, p. 3. The Examiner also acknowledged that Wuchinich and Sakurai fail to disclose or suggest an ultrasonic probe configured to produce cavitation, but contended that a person of ordinary skill in

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<sup>1</sup> It appears that the Examiner relied on Sakurai only for its disclosure of a probe that operates at the resonant frequency of a transducer, but that limitation is only present in Applicants' dependent claims 72 and 73. Nevertheless, Applicants address the proposed combination of Wuchinich, Sakurai, Weng, and Kuris with regard to claims 1-3, 6, 7, 9-11, 17, 19-22, 25, 26, 32, 64-66, 68, 69, 72, 73, and 76-78 below. In the event that the Examiner intended to reject all of the above-noted claims except for claims 72 and 73 in view of the combined teachings of only Wuchinich, Weng, and Kuris (and not Sakurai), Applicants note that the arguments provided below are equally applicable to such a rejection.

the art, in view of Weng, would have been motivated to modify the device resulting from the combination of Wuchinich and Sakurai to include "means for the ultrasonic probe to produce cavitation along the longitudinal axis in a medium surrounding the probe during use in order to destroy a thrombus in the patient's blood vessel." *Id.*, pp. 3-4. The Examiner further acknowledged that Wuchinich, Sakurai, and Weng fail to disclose the use of a radially asymmetric cross section, but contended that a person of ordinary skill in the art, in view of Kuris, would have found it obvious to modify the device resulting from the combined teachings of Wuchinich, Sakurai, and Weng to include the bent tip illustrated in Kuris' Fig. 10.

Even if the device resulting from the combined teachings of Wuchinich, Sakurai, and Weng was modified to include Kuris' bent tip, as suggested by the Examiner, the resulting device would not include a probe that is configured such that cavitation is produced (or a probe configured to produce cavitation), in a medium surrounding the probe, along a portion of the probe having a radially asymmetric cross section when the portion of the probe having the radially asymmetric cross section torsionally vibrates during use, as required by Applicants' claims. Kuris describes his bent tip 51c as being displaced longitudinally to remove foreign deposits from a vessel wall. *See, e.g., Kuris*, col. 11, lines 73-75; col. 10, lines 42-52. There is no indication that Kuris' bent tip produces cavitation as a result of this longitudinal motion. And there is certainly no indication that Kuris' bent tip would produce cavitation if it were torsionally vibrated during use. Nor would a person of ordinary skill in the art, after having read Wuchinich, Sakurai, Weng, and Kuris, have expected Kuris' bent tip to produce cavitation when combined with the devices of Wuchinich, Sakurai, and Weng in the manner suggested by the Examiner.

In addition, there is no indication that the resonator of Wuchinich, the vibration transmitting member of Sakurai, or the tip of Weng include a radially asymmetric portion that is configured to produce cavitation when torsionally vibrated during use. Wuchinich describes an ultrasonic tissue dissection system that produces both longitudinal and torsional motion at a tissue contacting tip of a resonator for the purpose of tissue dissection. *See, e.g., Wuchinich*, paragraph 0062. Wuchinich's resonator includes a portion having an inhomogenous cross section that can help to transform longitudinal motion into longitudinal and torsional motion. *See, e.g., id.*, paragraph 0070. There is no indication, however, that the inhomogenous portion of

Wuchinich's resonator, or any other portion of Wuchinich's resonator, is configured to produce cavitation when torsionally vibrated during use. Sakurai similarly describes an ultrasonic calculus treatment apparatus that transmits longitudinal and/or torsional vibration to a distal tip of a vibration transmitting member for contact with a calculus. See, e.g., Sakurai, Abstract; paragraphs 0042-0051. Sakurai notes that the calculus is shattered or broken apart when the vibrating tip comes into contact with the calculus. See, e.g., id., paragraph 0046. Sakurai's vibration transmitting member is not described as having a portion with a radially asymmetric cross section. Nor is there any indication that any portion of Sakurai's vibration transmitting member is configured to produce cavitation when torsionally vibrated during use. The tip of Weng's device is designed to produce cavitation when the tip is vibrated longitudinally. See, e.g., Weng, col. 6, lines 10-14; col. 10, lines 34-54; col. 14, lines 8-23. There is no indication that Weng's tip is configured to produce cavitation when torsionally vibrated during use.

Furthermore, a person of ordinary skill would not have combined the teachings of Wuchinich, Sakurai, Weng and Kuris in the manner suggested by the Examiner. For example, while the Examiner contended that a person of ordinary skill in the art, in view of Kuris, would have found it obvious to modify the device resulting from the combined teachings of Wuchinich, Sakurai, and Weng to include Kuris' bent tip, such a modification would not have been obvious. Weng explained that his tip design advantageously optimized cavitation resulting from longitudinal motion of his device. See, e.g., Weng, col. 10, lines 22-54. A person of ordinary skill in the art would have understood that modifying this tip design to include a bent tip of the type described in Kuris would have negatively affected the tip's ability to optimize cavitation as a result of longitudinal motion. In addition, there is no indication that the cavitation created by Weng's tip is insufficient for its intended purpose of destroying a thrombus, so a person of ordinary skill in the art would not have gone to the extra effort of modifying Weng's tip in the manner suggested by the Examiner, especially since such a person would have understood that modifying Weng's tip in this way would likely have an adverse effect on the ability of the tip to create cavitation in the manner that Weng described.

In view of the foregoing discussion, Applicants request reconsideration and withdrawal of the rejection 1-3, 6, 7, 9-11, 17, 19-22, 25, 26, 32, 64-66, 68, 69, 72, 73, and 76-78.

Claims 5 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wuchinich in view of Sakurai, in further view of Weng, and in further view of U.S. Pub. 2002/0029054 ("Rabiner"). However, Rabiner does not cure the deficiencies of Wuchinich, Sakurai, and Weng that were discussed above. Therefore, Applicants submit that Applicants' claims are patentable over Wuchinich, Sakurai, Weng, and Rabiner, whether taken alone or in any proper combination.<sup>2</sup>

Claims 8, 12, 14, 15, 24, 27, 29, 30, 67 and 70 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wuchinich in view of Sakurai in view of Weng, in view of Kuris and further in view of U.S. Pub. 2003/0212331 ("Fenton"). However, Fenton fails to cure the deficiencies of Wuchinich, Sakurai, Weng, and Kuris that were discussed above. Therefore, Applicants request that this rejection be reconsidered and withdrawn.

Claim 18 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Wuchinich in view of Sakurai in view of Weng in view of Kuris and further in view of U.S. Pat. 6,433,464 ("Jones"). However, Jones fails to cure the deficiencies of Wuchinich, Sakurai, Weng, and Kuris that were discussed above. Applicants, therefore, request reconsideration and withdrawal of this rejection.

Claims 74 and 75 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wuchinich in view of Sakurai in view of Weng in view of Kuris and further in view of U.S. Pat. 5,935,142 ("Hood"). However, Hood fails to cure the deficiencies of Wuchinich, Sakurai, Weng, and Kuris that were discussed above. Applicants, therefore, request reconsideration and withdrawal of this rejection.

No fees are believed to be due at this time. Please apply any charges or credits to deposit account 06-1050, referencing Attorney Docket No. 18554-035001.

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<sup>2</sup> The Examiner appears to have intended to reject claims 5 and 23 as being unpatentable over the combined teachings of Wuchinich, Sakurai, Weng, Kuris, and Rabiner. Even if this is the case, Rabiner fails to cure the deficiencies of Wuchinich, Sakurai, Weng, and Kuris discussed above, and thus Applicants request that this rejection be reconsidered and withdrawn.

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Serial No. : 10/774,985  
Filed : February 9, 2004  
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Attorney's Docket No.: 18554-035001

Respectfully submitted,

Date: February 21, 2008



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